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PENSOFT

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Review of the world species of *Paroplitis* Mason, 1981 (Hymenoptera, Braconidae, Microgastrinae), with description of three new species

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http://zoobank.org/CCD0B21C-371A-4CD2-89B7-15DB1C8DED3A

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Abstract

The world species of the microgastrine genus *Paroplitis* (Hymenoptera: Braconidae) are revised. Three new species are described, *P. horticola* Fujie & Fernandez-Triana, **sp. nov.** and *P. japonicus* Fujie & Fernandez-Triana, **sp. nov.** from Japan and *P. kakhetiensis* Fujie, Japoshvili & Fernandez-Triana, **sp. nov.** from Georgia. *P. vietnamensis* van Achterberg & Fernandez-Triana, 2013 is re-described, based on additional specimens. *P. wesmaeli* Ruthe, 1860 is recorded from Georgia for the first time. A key to the nine known species (eight described and one undescribed) of the genus is provided.

Key Words

Palaearctic, taxonomic revision, world key, parasitoid wasps, Japan, Georgia

Introduction

The subfamily Microgastrinae (Hymenoptera: Braconidae) is a large group of parasitoid wasps living on the larvae of Lepidoptera (Mason 1981, Fernandez-Triana et al. 2020). The genus *Paroplitis* Mason, 1981 is a rather infrequently collected taxon in the subfamily which is poorly represented in collections. This genus was erected to accommodate a group of species in the Microgastrini sensu Mason (1981) with strongly flattened mesosoma, short antenna, short and robust legs, smooth metanotum and propodeum usually with a transverse carina. It is distributed in the Nearctic, Palaearctic and Oriental Regions, with five described species previous to this publication (Fernandez-Triana et al. 2013, 2020).

As a result of studies being carried out by the authors on the Microgastrinae fauna of Georgia (GJ and JFT), new material, representing one additional species of *Paroplitis*, was discovered. Additionally, until now, no species were known in the eastern Palaearctic Region; however, ongoing research on the Microgastrinae fauna of Japan (SF and JFT), has revealed two new species for Japan. This paper describes these three new species and provides an updated key to the world species.

Materials and methods

Specimens of the new species were collected by Malaise traps and yellow pan traps in Japan and Georgia. The material has been deposited in the repositories listed below.

AUG Institute of Entomology, Agricultural University of Georgia, Tbilisi, Georgia;
CNC Canadian National Collection of Insects, Ottawa, Canada;
HNHM Hungarian Natural History Museum, Budapest, Hungary;
KPMNH Kanagawa Prefectural Museum of Natural History, Odawara, Japan;

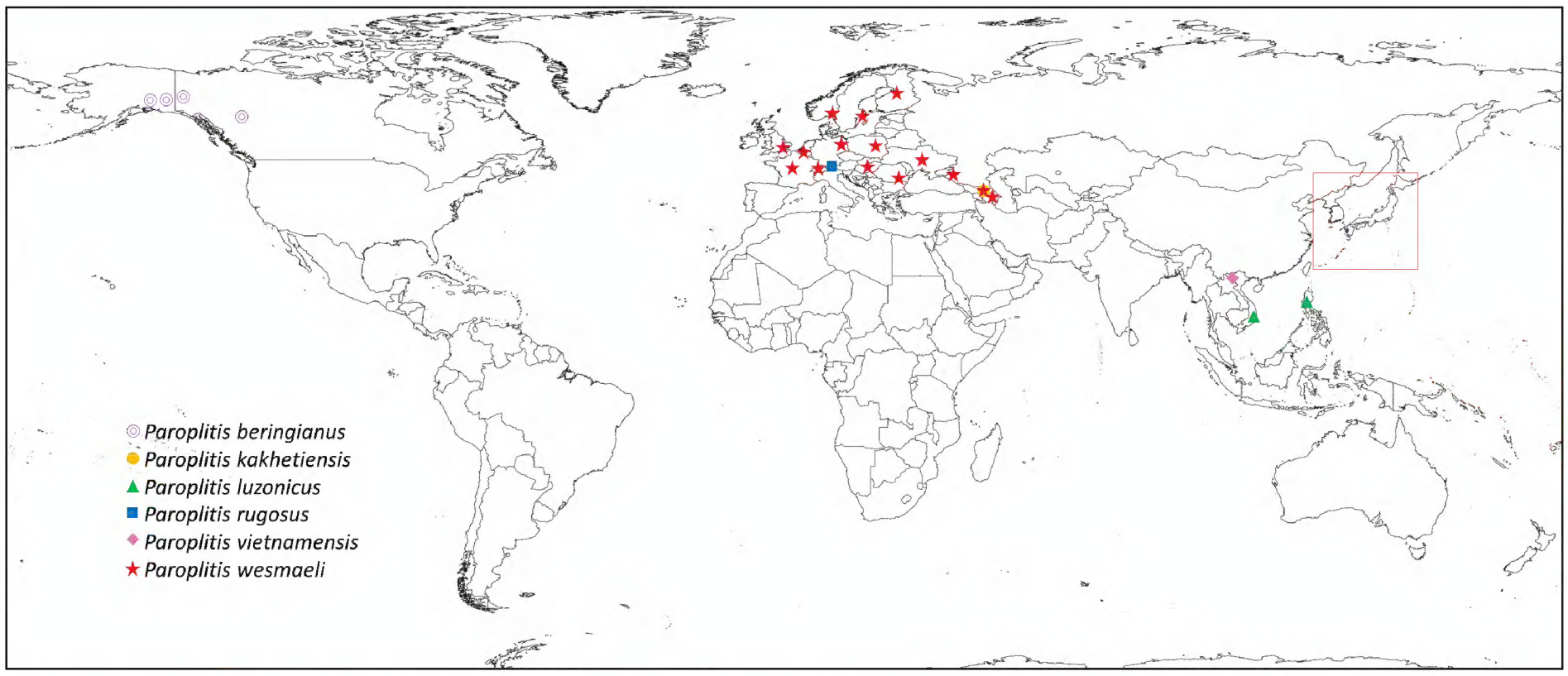


Figure 1. Distribution map of world species of genus *Paroplitis*. Species are individually colour-coded. The distribution of two Japanese species, inside the red open rectangle, is shown in Fig. 2.

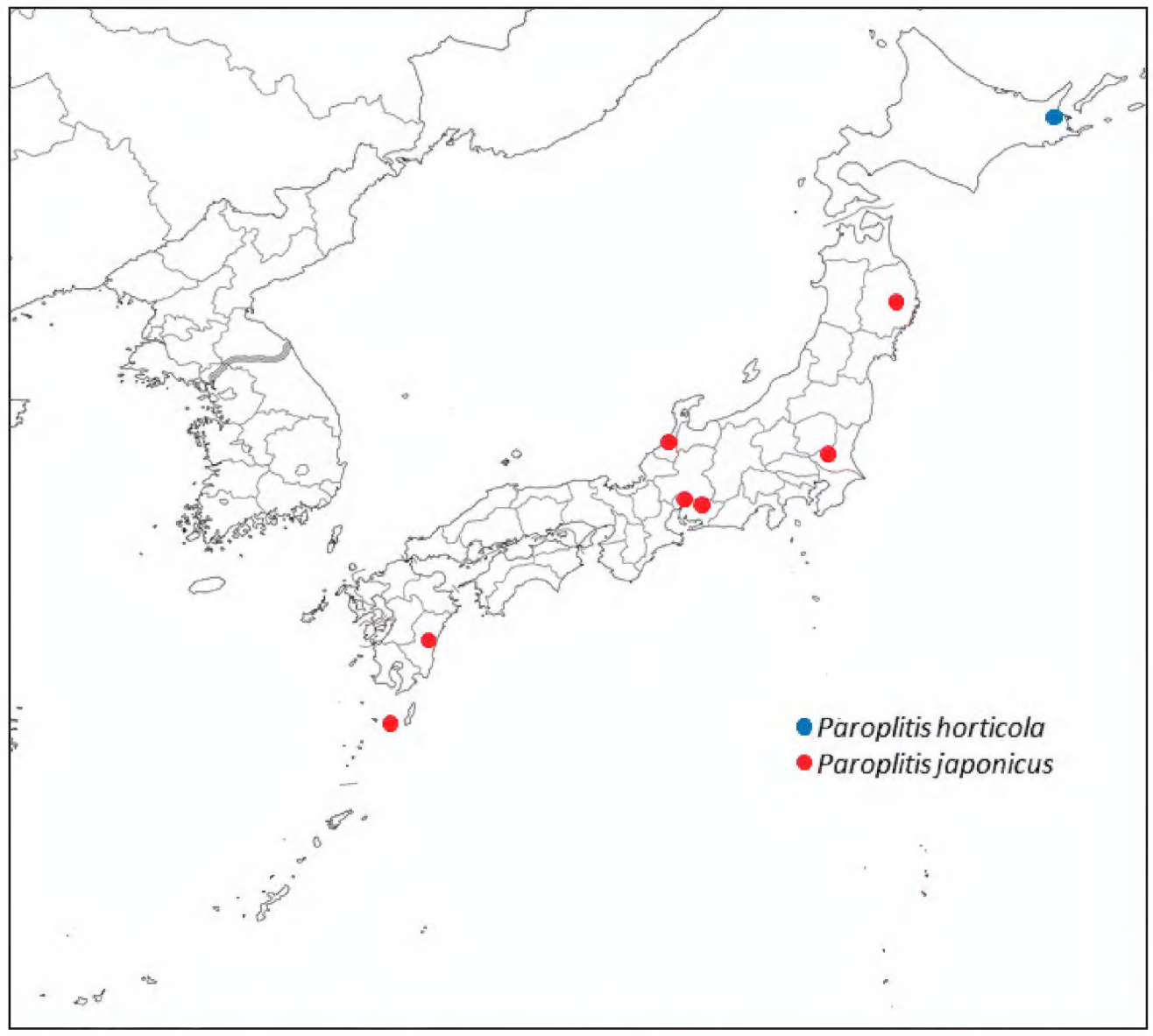


Figure 2. Distribution map of Japanese species of genus *Paroplitis*. Species are individually colour-coded.

MUNJ Meijo University, Nagoya, Japan;
NARO Institute for Agro-Environmental Sciences, NARO (= NIAES: National Institute for Agro-Environmental Sciences), Tsukuba, Japan;
OMNH Osaka Museum of Natural History, Osaka, Japan
SEHU The Laboratory of Systematic Entomology, Faculty of Agriculture, Hokkaido University, Sapporo, Japan.

Morphological terms and measurements follow Mason (1981), Huber and Sharkey (1993), Whitfield (1997), Karlsson and Ronquist (2012) and Fernandez-Triana et al. (2014). The abbreviations F2, F3, F14 and F15 refer to antennal flagellomeres 2, 3, 14 and 15; T1, T2 and T3 are used for metasomal mediotergites 1, 2 and 3; and L and W refer to length and width, respectively. Abbreviations for standard measurements of distances between compound eye and ocelli are as follows: POL – Posterior Ocellar Line, OOL – Ocular Ocellar Line, OD – Ocellar Diameter (of a posterior ocellus). For every diagnostic description, we state the number of specimens we measured (using "n = number"), which always included the holotype and some, but not all, paratypes.

Photos of specimens were taken with Keyence VHX-1000 and VHX-7000 Digital Microscopes, using a lens with a range of 10–130×. Multiple images were taken of the structures through the focal plane and then combined to produce a single in-focus image using the software associated with the Keyence System. Plates were prepared using Microsoft PowerPoint 2010 and saved as .TIF files.

A map with the distribution of the species was generated using SimpleMappr (Shorthouse 2010).

Results and discussion

We recognise eight species of *Paroplitis* worldwide, including three new species described in the present paper. We are aware of at least one other undescribed species from India (Ahmed 2017) which we could not examine. It is included in the key, based on the description provided by Ahmed (2017). Although the distributions of some species overlap (Fig. 1), they tend to inhabit different altitudes and some species seem to have a limited distribution within a biogeographical region. *Paroplitis* appears to be mostly distributed in temperate zones, but occasionally reaches northern areas of the Oriental Region (Fernandez-Triana et al. 2013). Including the new taxa described below, three species are recorded from the western Palaearctic, two from the eastern Palaearctic, one from the Nearctic and three from the Oriental Region. We anticipate that additional species will be found as more comprehensive collecting and study of world collections advances.

Key to the world species of the genus *Paroplitis* [Female specimens]

1 T1 and T2 entirely sculptured (Figs 14, 19) 2

– T1 smooth on posterior half (except for *P. wesmaeli*), T2 mostly smooth and shiny (at most with few, fine striae on lateral margins) (Figs 5, 22, 27)..... 4

2(1) F15 about 2.0× as long as wide; metafemur 3.5× as long as wide [Oriental Region: India; undescribed species incorrectly identified as *P. vietnamensis* in Ahmed (2017)]..... *Paroplitis* sp.

– F15 1.2–1.6× as long as wide (Fig. 15); metafemur 2.7–3.2× as long as wide (Fig. 12) [Palaearctic Region] 3

3(2) Propodeum evenly rugose on its entire surface, without distinctive carinae [western Palaearctic Region: Austria; known from single locality at 2,400 m altitude] ..... *P. rugosus* Papp, 1991

– Propodeum smooth at least anteriorly, with distinct median and transverse carinae (Fig. 14) [eastern Palaearctic Region: Japan] ..... *P. japonicus* Fujie & Fernandez-Triana, sp. nov.

4(1) Fore wing areolet quadrangular and relatively large, its maximum height 1.1× vein r length; fore wing with vein 2CUa tubular on its anterior 0.3–0.5 [Nearctic Region: Canada (British Columbia, Yukon) and United States (Alaska)]..... ..... *P. beringianus* Mason, 1981

– Fore wing with areolet triangular and relatively small, its maximum height at most 0.7× vein r length, usually much less (Figs 4, 21, 29); fore wing with vein 2CUa entirely nebulous [Palaearctic or Oriental Regions]..... 5

5(4) Scape, tegula, humeral complex and legs entirely yellow (except for anterior 0.5–0.7 of metacoxa which is brown); fore wing with vein R1 as long as or longer than pterostigma length and much longer than distance delimited between end of vein R1 and end of vein 3RSb [Oriental Region: Philippines, Vietnam]..... *P. luzonicus* Mason, 1981

– Scape, tegula, humeral complex and most of legs entirely brown to black; fore wing with vein R1 shorter than pterostigma length and same length (at most, slightly larger) as distance delimited between end of vein R1 and end of vein 3RSb (Figs 4, 21, 29) 6

6(5) Propodeum with a distinct areola medioposteriorly (Fig. 22) [western Palaearctic Region: Georgia; known from single locality at 1,840 m altitude] ..... *P. kakhetiensis* sp. nov. Japoshvili, Fujie & Fernandez-Triana, sp. nov.

– Propodeum without a distinct areola medioposteriorly (Fig. 5)..... 7

7(6) Propodeum usually without trace of transverse carina (although very rarely a more or less complete carina may be present); fore wing with areolet very small, its maximum height 0.2× vein r length, its maximum width 0.2× vein r length [western Palaearctic Region: Azerbaijan, Belgium, Finland, France, Georgia, Germany, Hungary, Poland, Romania, Russia (Krasnodar Kray), Sweden, Switzerland, Ukraine and United Kingdom] ..... *P. wesmaeli* (Ruthe, 1860)

– Propodeum with a more or less complete and defined transverse carina; fore wing with areolet larger, its maximum height 0.3–0.7× vein r length, its maximum width 0.4–0.7× vein r length (Figs 4, 29) [eastern Palaearctic and Oriental Regions]..... 8

8(7) Posterior ocelli comparatively larger, OOL/OD = 1.9–2.3, POL/OD = 1.4–1.5 (Fig. 9); F2 comparatively stouter, 1.1–1.3× as long as wide (Fig. 7); fore wing with areolet smaller, its maximum height 0.3–0.4× vein r length, its maximum width 0.4–0.6× vein r length (Fig. 4); longest setae on ovipositor sheath much longer than maximum width of ovipositor sheath (Fig. 11) [eastern Palaearctic Region: Japan] ..... *P. horticola* Fujie & Fernandez-Triana, sp. nov.

– Posterior ocelli comparatively smaller, OOL/OD = 2.3–2.6, POL/OD = 1.6–1.8 (Fig. 32); F2 comparatively slender, 1.5–1.6× as long as wide (Fig. 31); fore wing with areolet larger, its maximum height 0.4–0.7× vein r length, its maximum width 0.6–0.7× vein r length (Fig. 29); longest setae on ovipositor sheath, at most, slightly longer than maximum width of ovipositor sheath (Fig. 33) [Oriental Region: Vietnam]..... *P. vietnamensis* van Achterberg & Fernandez-Triana, 2013

Taxonomic treatment of species

Paroplitis beringianus Mason, 1981

Paroplitis beringianus Mason, 1981: 70. Original description.

Holotype. Female, CNC (examined). USA: AK, Mile 213 Alaska Richard Highway, 17-VI-1951, W. R. M. Mason, CNC15790.

Paratypes. 1 female (CNC). Canada: BC, Atlin, 1.VIII.1955, H. Huckel, CNC1040513.

Other specimens examined. 1 female (CNC). Canada: YT, Top of the world Highway, Km 82, 19.VII.2006, 64°05.411'N, 140°57.048'W, sweeping Clover along road, Goulet & Boudrealt, HYM00000543.

Description. A detailed description of the species and images are available in Mason (1981) and Fernandez-Triana et al. (2013).

Hosts. Unknown.

Distribution. Nearctic Region: Canada (British Columbia, Yukon) and United States (Alaska) (Mason 1981, Fernandez-Triana et al. 2013).

Paroplitis horticola Fujie & Fernandez-Triana, sp. nov.

http://zoobank.org/ECFB19F0-1347-40C2-A972-CC2353FD6769

Figs 3–11

Holotype. Female, NARO. Holotype labels: Japan: Hokkaido Pref., Nakashibetsu Town, Narabigaoka, MsT., 31. VIII. – 4. X. 2018, C. Nakata & M. Takada.

Paratypes. 8♀ (OMNH and NARO), same labels as holotype; 1♂ (CNC), same labels; 7♀ (CNC, OMNH and SEHU), same labels, except for collection date 28. V. –11. VII. 2018; 1♀ (OMNH), same labels except for collection date 8–31. VIII. 2018.

Diagnostic description. Female (n = 8). Body length: 2.1–2.4 mm; fore wing length: 2.1–2.4 mm; F2 L/W: 1.1–1.3×; F14 L/W: 1.1–1.4×; F15 L/W: 1.2–1.4×; F2 L/F14 L: 1.1–1.3×; OOL/ OD: 1.9–2.3×; POL/OD: 1.4–1.5×. Fore wing with vein 2CUa entirely nebulous; vein R1 shorter than pterostigma length and a little longer than distance delimited between end of vein R1 and end of vein 3RSb. Fore wing with areolet triangular and relatively small, its maximum height 0.3–0.4× vein r length, its maximum width 0.4–0.6× vein r length. Propodeum mostly smooth and shiny, with some rugosity longitudinally and along median transverse carina; median longitudinal carina complete, at least on anterior 0.5; transverse carina more or less developed. Metafemur L/W: 2.6–2.8×. Anterior 0.5 of T1 irregularly rugose, at least laterally, rest of T1 and T2 mostly smooth; T1 median length 1.8–2.0× its width at posterior margin; T2 width at posterior margin 2.0–2.2× its median length. Metatibia L: 0.74–0.84 mm. Metatibia L/ovipositor sheath L: 2.0–2.6×. Ovipositor sheath L: 0.31–0.38 mm. Maximum length of setae on ovipositor sheath much longer than maximum width of ovipositor sheath.

Body dark brown to black. Mouth parts, humeral complex, wing veins (except sometimes for C+SC+R, pterostigma, R1), trochantelli, posterior 0.2 of pro- and mesofemora, pro- and mesotibiae and tarsi, anterior 0.2 of metatibia and sternites brown to yellowish-brown. Palpi yellow.

Male (n = 1). Similar to female, except for flagellomeres with two ranks of placodes; F2 L/W: 1.9×; F14 L/W: 2.3×; F15 L/W: 2.3×.

Hosts. Unknown.

Distribution. Eastern Palaearctic: Japan (Hokkaido).

Etymology. Named "*horticola*" because type specimens were collected from a Malaise trap set in a garden.

Paroplitis japonicus Fujie & Fernandez-Triana, sp. nov.

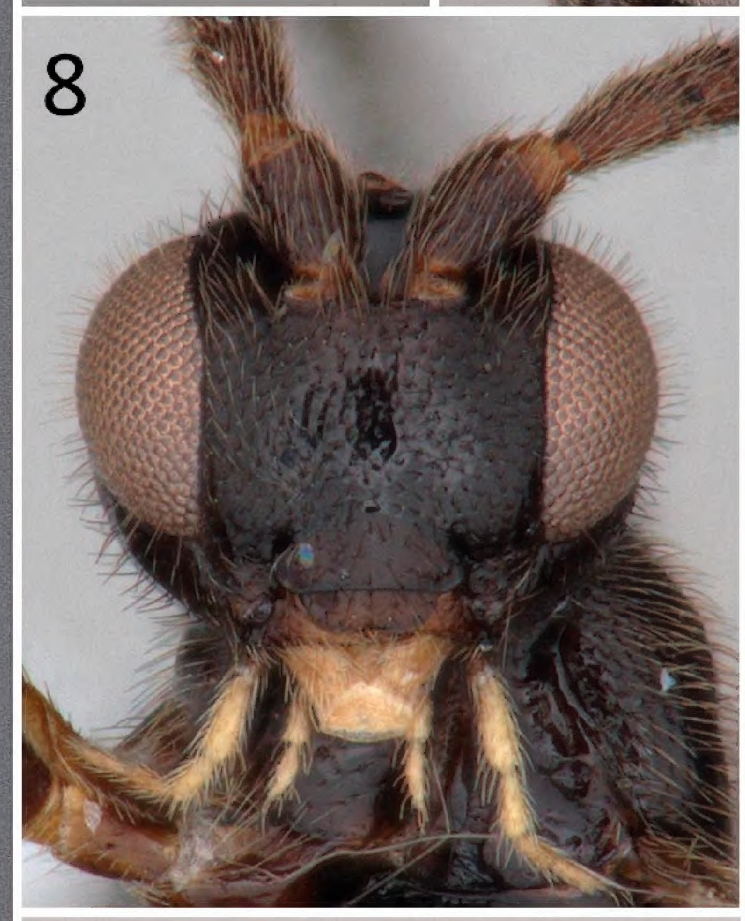
http://zoobank.org/2A3E63CA-5480-4366-B8B5-C295DC6B6452

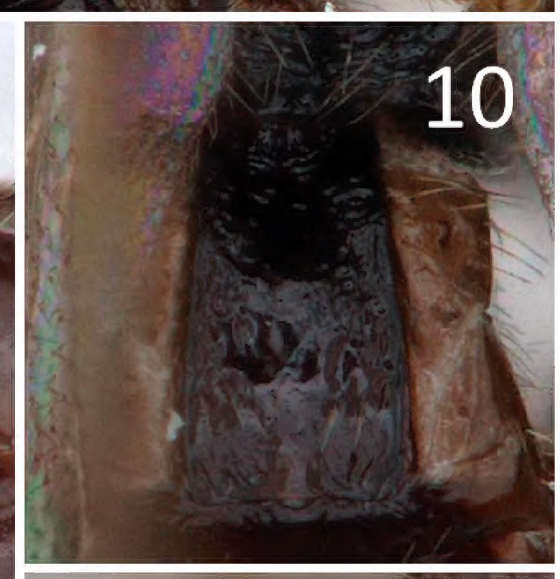
Figs 12–19

Holotype. Female, MUNJ. Holotype labels: Japan: Kyushu, Is. Yaku-shima, Shiratani, 600 m alt., 10. VII–8. VIII. 2000 T. Murata; MT (K. Nojima).

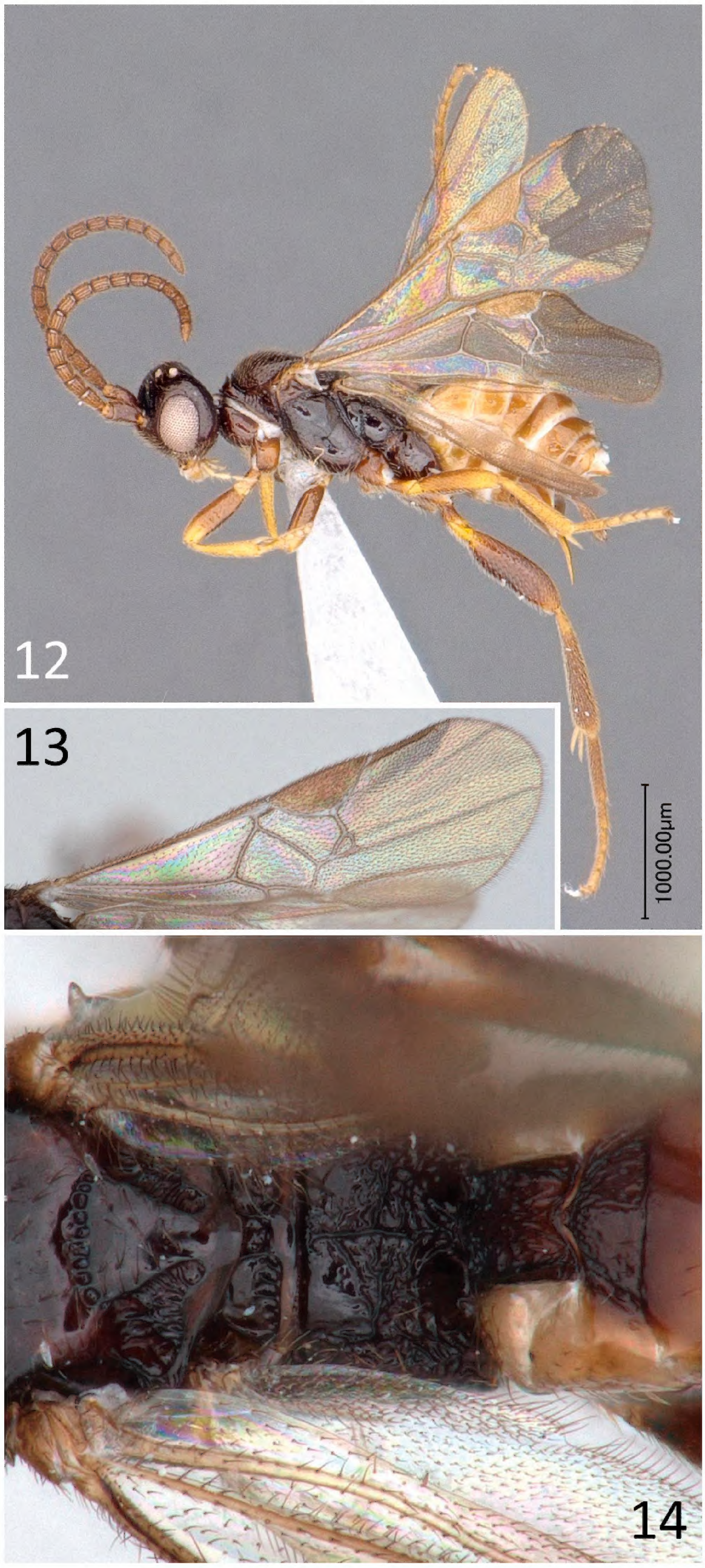
Paratypes. 1♀ (CNC), Japan: Honshu, Iwate Mt. Hayachine 400 m alt. 27. VI.–5. VII. 1989 H. Makihara and M. J. Sharkey MT.; 1♀ (CNC), Japan: Ibaraki Mt. Tsukuba 800 m alt., 14–25. VII. 1989 M. J. Sharkey PT.; 1♂ (MUNJ), Japan: Ishikawa Nomi, Mitsukuchi (paddy field) 8–21. IX. 2011 H. Fukutomi (MT) (10BK) R. Ishiguro; 1♀ (MUNJ), Japan: Ishikawa Nomi, Mitsukuchi (paddy field) 5–18. VIII. 2011 H. Fukutomi (MT) (8BK) R. Ishiguro; 2♀ (MUNJ), Japan: Aichi Asuke, Tanoshiri (Cypress forest) 30. VIII–6. IX. 2005 (A15) M. Kato (MT); 2♀ (NARO), Japan: Aichi Kasugai, Takagi 22–28. VI. 1994 Y. Suzuki, YPT; 1♀ (MUNJ), Japan: Miyazaki, Saito, Hokita, Rv. Takeo, 10. IX. 1999, M. Inokuchi; YPT.

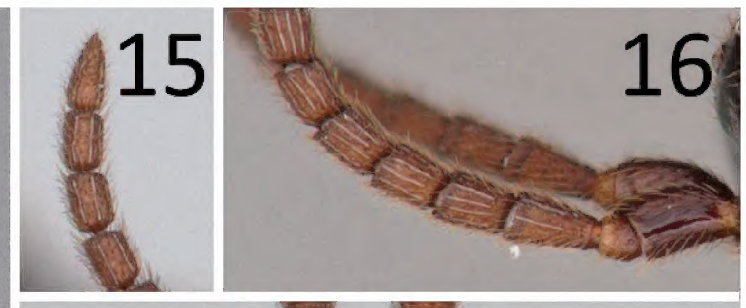
Diagnostic description. Female (n = 7)**.** Body length: 2.1–2.5 mm; fore wing length: 1.9–2.2 mm; F2 L/W: 1.3–1.6×; F14 L/W: 1.3–1.6×; F15 L/W: 1.2–1.6×; F2 L/F14 L: 1.1–1.3×; OOL/OD: 1.9–2.1×; POL/OD: 1.5–1.8×. Fore wing with vein 2CUa entirely nebulous; vein R1 shorter than pterostigma length and same length or a little longer than distance delimited between end of vein R1 and end of vein 3RSb. Fore wing with areolet triangular and relatively large, its maximum height 0.4–0.6× vein r length, its maximum width 0.7–0.9× vein r length. Propodeum mostly smooth and shiny dorsally, with some rugosity longitudinally and along median transverse carina; median longitudinal carina complete; transverse carina well developed, with additional, small, transverse striation near the carina. Metafemur L/W: 2.7–3.2×. T1 and T2 entirely coarsely rugose; T1 median length 2.1–2.6× its width at posterior margin; T2 width at posterior margin 2.1–2.6× its median length. Metatibia L: 0.64–0.76 mm. Metatibia L/ovipositor sheath L: 2.9–3.2×. Ovipositor sheath L: 0.20–0.25 mm. Maximum length of setae on ovipositor sheath, at most, slightly longer than maximum width of ovipositor sheath.

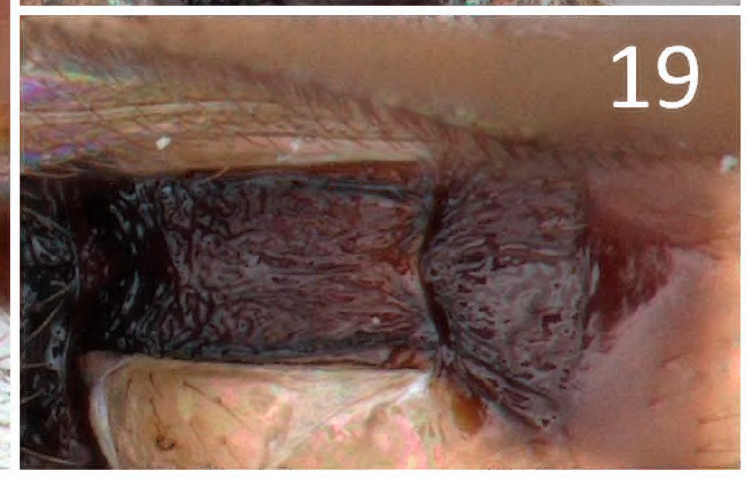




Figures 3–11. *Paroplitis horticola*, holotype. **3.** Habitus; **4.** Fore wing; **5.** Dorsal view of mesoscutellar disc, propodeum and mediotergites; **6.** Apical segments of antenna; **7.** Basal segments of antenna; **8.** Frontal view of head; **9.** Dorsal view of head; **10.** Detail of T1, dorsal view; **11.** Lateral view of ovipositor sheath and ovipositor tip.







Figures 12–19. *Paroplitis japonicus*, holotype; **12.** Habitus; **13.** Fore wing; **14.** Dorsal view of mesoscutellar disc, propodeum and mediotergites; **15.** Apical segments of antenna; **16.** Basal segments of antenna; **17.** Frontal view of head; **18.** Dorsal view of head and anteromesoscutum; **19.** Detail of T1 and T2, dorsal view.

Body dark brown. Mouth parts, antenna, humeral complex, wing veins and most of legs brown. Trochantelli, apical part of pro- and mesofemora, pro- and mesotibiae and tarsi, anterior 0.2 of metatibia and basal sternites yellowish-brown. Palpi pale yellow.

Male. Similar to female, except for flagellomeres with two ranks of placodes; F2 L/W: 2.5×; F14 L/W: 2.3×; F15 L/W: 2.2×.

Hosts. Unknown.

Distribution. Eastern Palaearctic: Japan (Honshu, Kyushu, Yakushima).

Etymology. The name refers to the country where the species is found.

Paroplitis kakhetiensis Japoshvili, Fujie & Fernandez-Triana, sp. nov.

http://zoobank.org/6A970B8F-A95B-43BF-9B46-35A1F1BF21C9

Figs 20–27

Holotype. Female, AUG. Holotype labels: Georgia: Lagodekhi Reserve, Mt. Kudigora, 41.882733°N, 46.321850°E, 1,841 m alt., 5–15. V. 2014, Malaise Trap, G. Japoshvili, CNC507801.

Description. Female (n = 1)**.** Body length: 2.4 mm. Fore wing length: 2.4 mm. F2 L/W: 1.4×. F14 L/W: 1.3×. F15 L/W: 1.3×. F2 L/F14 L: 1.2×. OOL/OD: 2.1×. POL/OD: 1.4×. Fore wing with vein 2CUa entirely nebulous; vein R1 shorter than pterostigma length and a little longer than distance delimited between end of vein R1 and end of vein 3RSb. Fore wing with areolet triangular and relatively small, its maximum height 0.3× vein r length, its maximum width 0.5× vein r length. Propodeum mostly smooth and shiny, with some rugosity longitudinally and along median transverse area, without trace of some transverse carina; median longitudinal carina complete at least on anterior 0.5; propodeal areola present medio-posteriorly. Metafemur L/W: 2.5×. Anterior 0.5 of T1 coarsely punctate-rugose, rest of T1 and T2 mostly smooth; T1 median length 1.7× its width at posterior margin; T2 width at posterior margin 1.8× its median length. Metatibia L: 0.79 mm. Metatibia L/ovipositor sheath L: 2.9×. Ovipositor sheath L: 0.27 mm. Maximum length of setae on ovipositor sheath at most slightly longer than maximum width of ovipositor sheath.

Body dark brown to black. Mouth parts, humeral complex, wing veins, trochantellus, apical part of pro- and mesofemora, pro- and mesotibiae and tarsi and anterior 0.2 of metatibia brown to yellowish-brown. Palpi yellow.

Male. Unknown.

Hosts. Unknown.

Distribution. Western Palaearctic Region: Georgia.

Etymology. The species is named after the region in Georgia (Kakheti), where it was found.

Comments. The distribution of *P. kakhetiensis* seems to overlap with that of *P. wesmaeli*, although *P. kakhetiensis* was collected at a higher altitude (1840 m) than *wesmaeli* specimens.

Paroplitis luzonicus Mason, 1981

Paroplitis luzonicus Mason, 1981: 70. Original description.

Holotype. Female, AEI (not examined). Holotype labels: Philippine Is., Luzon I., Mt. Data, 7800 ft. [2,400 m] alt., Oak forest, 31 December 1952, Townes family.

Description. A detailed description of the species and images are available in Mason (1981) and Fernandez-Triana et al. (2013).

Hosts. Unknown.

Distribution. Oriental Region: Philippines, Vietnam (Mason 1981, Fernandez-Triana et al. 2013).

Paroplitis rugosus Papp, 1991

Paroplitis rugosus Papp, 1991: 165. Original description.

Holotype. Female, HNHM (not examined). Holotype labels: Austria, Tirol, Obergurgl, Belstein, 2400 m alt., 7 September 1970, leg. S. Mahunka.

Description. A detailed description and images of the species in Papp (1991).

Hosts. Unknown.

Distribution. Western Palaearctic Region: Austria (Papp 1991).

Comments. Only known from the female holotype. Its distribution seems to overlap with that of *P. wesmaeli*, although *P. rugosus* was collected in the Alps at a higher altitude (2400 m) than European specimens of *wesmaeli*.

Paroplitis vietnamensis van Achterberg & Fernandez-Triana, 2013

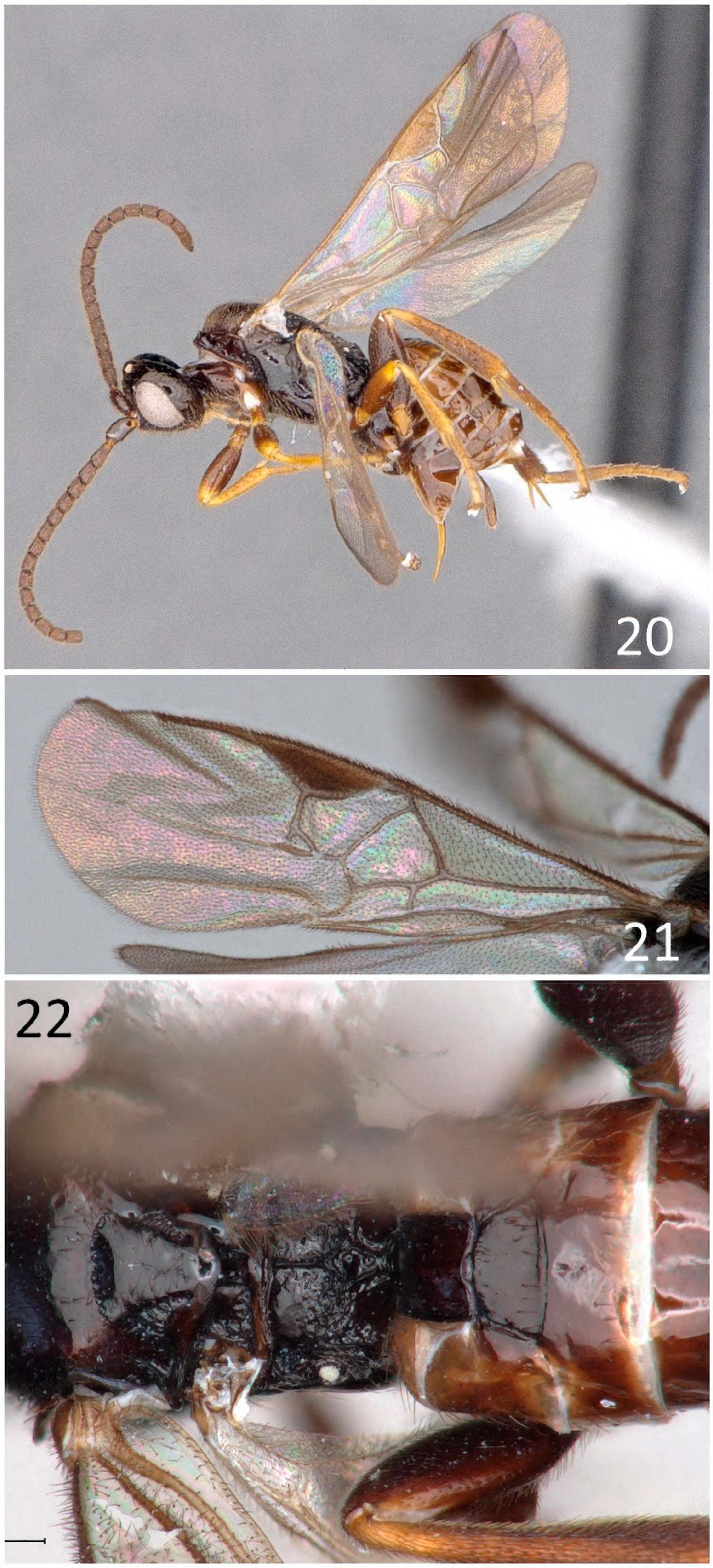
Figs 28–33

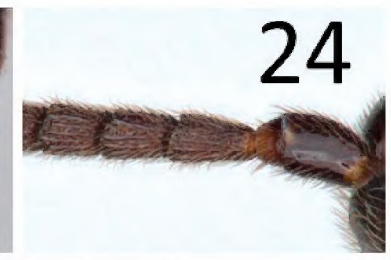
Paroplitis vietnamensis Fernandez-Triana et al. 2013: 555. Original description.

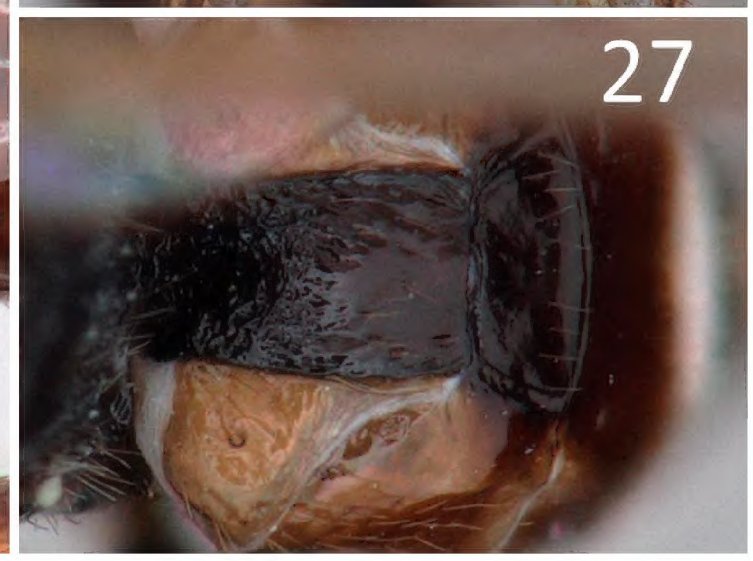
Holotype. Female, NCB (examined). Holotype labels: 1. NW Vietnam: Tonkin. Hoang Lien N. R., 15 km W Sa Pa, ca. 1900 m alt., 15–21. X. 1999, Malaise traps, C. v. Achterberg, RMNH'99.

Paratype. 1 female (CNC), NW Vietnam: Tonkin Hoang Lien N. R. 15 km W Sa Pa, ca. 1900 m alt. 15–21. X. 1999, Malaise traps C. v. Achterberg, RMNH'99.

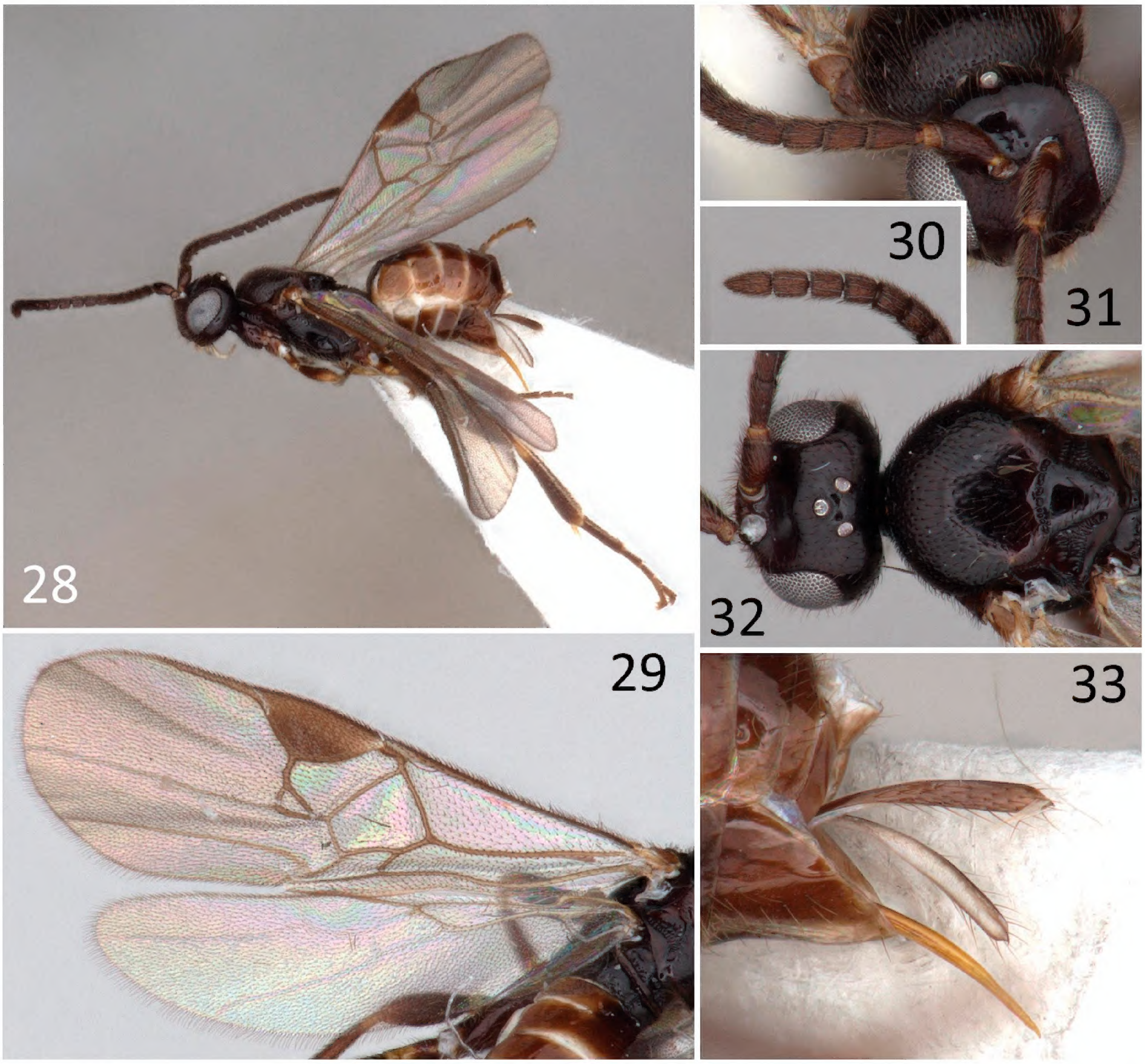
Other specimens examined. 1 female (CNC), N. Vietnam: Hoa Binh Hang Kia Pâ Cô N. R., 1332 m alt., 20°44'37"N, 104°53'45"E, 2.III–15.IV.2011, Malaise trap, 5, C. v. Achterberg, RMNH'11", CNC308759; 1 female (CNC), N. Vietnam: Hoa Binh Hang Kia Pá Có N. R., 1329 m alt., 20°44'36"N, 104°53'45"E, 2.III–15.







Figures 20–27. *Paroplitis kakhetiensis*, holotype. **20.** Habitus; **21.** Fore wing; **22.** Dorsal view of mesoscutellar disc, propodeum and mediotergites; **23.** Apical segments of antenna; **24.** Basal segments of antenna; **25.** Frontal view of head; **26.** Dorsal view of head; **27.** Detail of T1 and T2, dorsal view.



Figures 28–33. *Paroplitis vietnamensis*, paratype. **28.** Habitus; **29.** Wings; **30.** Apical segments of antenna; **31.** Basal segments of antenna; **32.** Dorsal view of head and anteromesoscutum; **33.** Lateral view of ovipositor sheath and ovipositor.

IV. 2011, Malaise trap 6, C. v. Achterberg, RMNH'11, CNC308758.

Description. A detailed description of the species and images are available in Fernandez-Triana et al. (2013). However, the description was based on only three specimens. Here, we provide an updated description based on two additional females which we were able to study. **Female.** Body length: 2.1–2.3 mm; fore wing length: 2.1–2.4 mm; F2 L/W: 1.5–1.6×; F14 L/W: 1.2–1.4×; F15 L/W: 1.2–1.4×; F2 L/F14 L: 1.1–1.6×; OOL/OD: 2.3–2.6×; POL/OD: 1.6–1.8×. Fore wing with vein 2CUa entirely nebulous; vein R1 shorter than pterostigma length and a little longer than distance delimited between end of vein R1 and end of vein 3RSb. Fore wing with areolet triangular and relatively small, its maximum height 0.4–0.6× vein r length, its maximum width 0.6–0.7× vein r length. Propodeum mostly smooth and shiny, with some rugosity longitudinally and along median transverse carina; median longitudinal carina complete, at least on anterior 0.5; transverse carina more or less developed. Metafemur L/W: 2.5–2.8×. Anterior 0.5 of T1 irregularly rugose, at least laterally, rest of T1 and T2 mostly smooth; T1 median length 1.7–1.9× its width at posterior margin; T2 width at posterior margin 2.0–2.2× its median length. Metatibia L: 0.65–0.74 mm. Metatibia L/ovipositor sheath L: 2.2–2.4×. Ovipositor sheath L: 0.28–0.34 mm. Maximum length of setae on ovipositor sheath, at most, slightly longer than maximum width of ovipositor sheath.

Hosts. Unknown.

Distribution. Oriental Region: northern Vietnam (Fernandez-Triana et al. 2013, 2020).

Paroplitis wesmaeli (Ruthe, 1860)

Microgaster picipes Wesmael, 1837: 38. See *Microgaster wesmaeli* Ruthe below.

Microgaster wesmaeli Ruthe, 1860: 148. Replacement name for *Microgaster picipes* Wesmael, 1837.

Apanteles wesmaeli (Ruthe, 1860). Transferred by Dalla Torre 1898: 185.

Hypomicrogaster wesmaeli (Ruthe, 1860). Transferred by Nixon 1965: 210.

Paroplitis wesmaeli (Ruthe, 1860). Transferred by Mason 1981: 71.

Holotype. Female, IRSNB (not examined). Holotype label: environs de Bruxelles.

Other specimens examined. 1 female (CNC), Netherlands: Utrecht, Leersum, VI.1975, H. J. Vlug, DNA Voucher CNCHYM 01946; 1 female (CNC), Switzerland: Jura, Delémont, 47.373056°N, 7.324722°E, 19.VI–6.VII.2014, Malaise Trap, forest edge, J. Squire, CNC486249; 1 female (CNC), same data, except for collecting date 26.V–19.VI.2014, CNC475799; 1 female (CNC), Georgia: Lagodekhi Reserve, Mt. Kudigora, 41.852483°N, 46.287767°E, 666 m alt., 15–25.VI.2014, Malaise Trap, G. Japoshvili, CNC506804; 2 females (CNC), same data, except for collecting date 25.VI–5.VII.2014, CNC508005 and CNC508036; 1 female (CNC), same data, except for collecting date 26.VII–5.VIII.2014, CNC507604; 1 female (CNC), Georgia: Lagodekhi Reserve, Mt. Kudigora, 41.855850°N, 46.292733°E, 847 m alt., 25.VI–5.VII. 2014, Malaise Trap, G. Japoshvili, CNC497135.

Description. A detailed description and images of the species in Papp (1991) and Fernandez-Triana et al. (2013).

Hosts. Gregarious. Hosts: A gregarious parasitoid of scopariine Crambidae feeding in mosses (Shaw 2012); see also Yu et al. (2016).

Distribution. Western Palearctic Region: Azerbaijan, Belgium, Finland, France, Georgia, Germany, Hungary, Poland, Romania, Russia (Krasnodar Kray), Sweden, Switzerland, Ukraine and United Kingdom (Fernandez-Triana et al. 2013, 2020).

Comments. This species has a widespread distribution in the western Palaearctic Region and it also has relatively large morphological variation – for example, propodeum with a transverse carina (commonly) or without a transverse carina (rarely); areola size small (commonly) or relatively larger (rarely). We suspect that, under the name *P. wesmaeli*, there could be a complex of species. However, more collecting and study of specimens (throughout the Palaearctic Region), as well as DNA barcoding, will be needed before any attempt to unravel this complex is made.

Paroplitis sp.

Paroplitis vietnamensis Ahmed (2017: 103). Misidentification.

Distribution. Oriental Region: India (Jammu and Kashmir).

Comments. This species seems to be closely related to *P. rugosus* and *P. japonicus* in having mostly entirely sculptured T1 and T2, comparatively large areolet and R1 almost as long as the length of pterostigma. However, it differs by comparatively slender F15, propodeum with longitudinal carina and comparatively slender metafemur, according to photographs by Ahmed (2017: his plate 32). These morphological differences are strong enough to consider it as a separate species. As we have not been able to examine specimens of this species, it shall remain undescribed for the time being.

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References

Ahmed I (2017) Taxonomic Studies on Braconidae (Hymenoptera: Insecta) from Jammu Division of the State Jammu and Kashmir, India. Doctoral dissertation, Aligarh Muslim University.

Fernandez-Triana J, Ward DF, Cardinal S, van Achterberg C (2013) A review of *Paroplitis* (Braconidae, Microgastrinae) and description of a new genus from New Zealand, *Shireplitis*, with convergent morphological traits. Zootaxa 3722(4): 549–568. https://doi.org/10.11646/zootaxa.3722.4.6

Fernandez-Triana J, Shaw MR, Boudreault C, Beaudin M, Broad GR (2020) Annotated and illustrated world checklist of Microgastrinae parasitoid wasps (Hymenoptera, Braconidae). ZooKeys 920: 1–1089. https://doi.org/10.3897/zookeys.920.39128

Fernandez-Triana J, Whitfield J, Rodriguez J, Smith M, Janzen D, Hajibabaei M, Burns J, Solis A, Brown J, Cardinal S, Goulet H, Hebert P (2014) Review of *Apanteles sensu stricto* (Hymenoptera, Braconidae, Microgastrinae) from Area de Conservación Guanacaste, north-western Costa Rica, with keys to all described species from Mesoamerica. ZooKeys 383: 1–565. https://doi.org/10.3897/zookeys.383.6418

Huber JT, Sharkey MJ (1993) Structure. In: Goulet H, Huber JT (Eds) Hymenoptera of the World: An Identification Guide to Families. Monograph No. 1894E. Agriculture Canada Research Branch, Ottawa, 13–59.

Karlsson D, Ronquist F (2012) Skeletal morphology of *Opius dissitus* and *Biosteres carbonarius* (Hymenoptera: Braconidae), with a discussion of terminology. PLoS ONE 7(4): e32573. https://doi.org/10.1371/journal.pone.0032573

Mason WRM (1981) The polyphyletic nature of *Apanteles* Foerster (Hymenoptera: Braconidae): A phylogeny and reclassification of Microgastrinae. Memoirs of the Entomological Society of Canada, Ottawa, 147 pp. https://doi.org/10.4039/entm113115fv

Papp J (1991) New Braconid wasps (Hymenoptera, Braconidae) in the Hungarian Natural History Museum, 2. Annales Historico-Naturales Musei Nationalis Hungarici 83:145–167.

Shaw MR (2012) Notes on some European Microgastrinae (Hymenoptera: Braconidae) in the National Museums of Scotland, with twenty species new to Britain, new host data, taxonomic changes and remarks, and descriptions of two new species of *Microgaster* Latreille. Entomologist's Gazette 63: 173–201.

Shorthouse DP (2010) SimpleMappr, an online tool to produce publication-quality point maps. http://www.simplemappr.net [accessed 10 March, 2020]

Whitfield JB (1997) Subfamily Microgastrinae. In: Wharton RA, Marsh PM, Sharkey MJ (Eds) Manual of the New World genera of the family Braconidae (Hymenoptera). Special Publication No. 1. International Society of Hymenopterists, Washington, 333–364.

Yu DSK, van Achterberg C, Horstmann K (2016) Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive. Nepean, Ontario. http://www.taxapad.com [Ottawa, Ontario, Canada]